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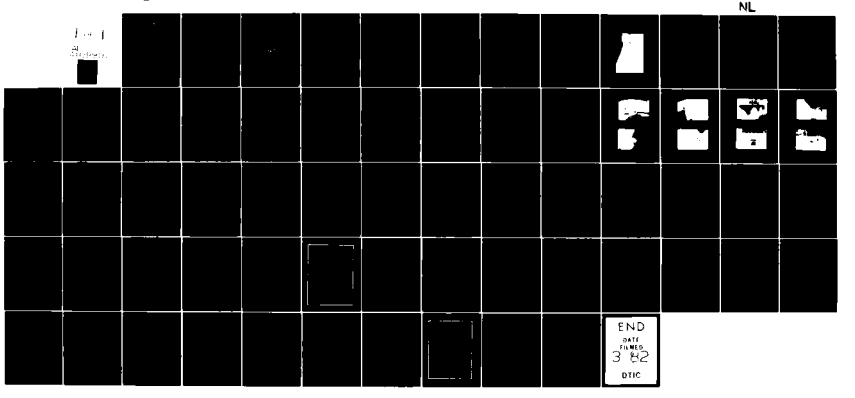

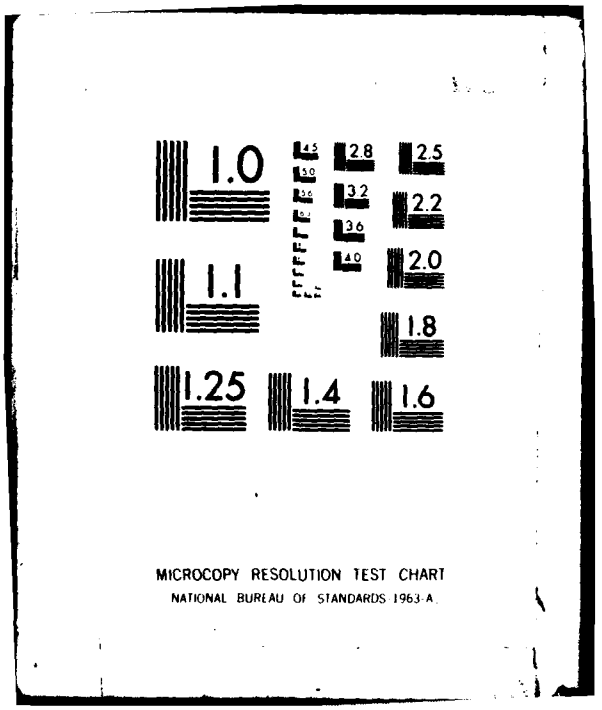
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REPORT DOCUMENTATION PAGE

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National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability

Garnet Lake Dam
Warren County, NY
Upper Hudson River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Visual inspection of this dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further engineering investigations.

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Using the Corps of Engineer's Screening Criteria for the initial review of spillway adequacy, it has been determined that the structure would be overtopped by all storms exceeding 26% of the Probable Maximum Flood (PMF). Since the upper portion of this dam is an earth embankment, overtopping could cause failure of the dam. A dam break analysis indicates that an overtopping induced failure would significantly increase the hazard to loss of life downstream of the dam from that which would exist just prior to failure. Therefore, the spillway is adjudged to be "seriously inadequate" and the dam is assessed as "unsafe; non-emergency".

Immediately upon receipt of this notification, a system for providing around-the-clock surveillance of the dam during periods of unusually heavy precipitation should be developed and implemented. An emergency action plan for the notification and evacuation of downstream residents should also be developed.

UPPER HUDSON RIVER BASIN

GARNET LAKE DAM

WARREN COUNTY, NEW YORK

INVENTORY NO. N.Y. 1167

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST, 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
GARNET LAKE DAM
I.D. NO. NY1167
#186-574 UPPER HUDSON RIVER BASIN
WARREN COUNTY, NEW YORK

TABLE OF CONTENTS

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Garnet Lake Dam (I.D. No. NY-1167)
State Located:	New York
County:	Warren
Watershed:	Upper Hudson River Basin
Stream:	Mill Creek
Date of Inspection:	July 28, 1981

ASSESSMENT:

Visual inspection of this dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some deficiencies which require further engineering investigations.

Using the Corps of Engineer's Screening Criteria for the initial review of spillway adequacy, it has been determined that the structure would be overtopped by all storms exceeding 26% of the Probable Maximum Flood (PMF). Since the upper portion of this dam is an earth embankment, overtopping could cause failure of the dam. A dam break analysis indicates that an overtopping induced failure would significantly increase the hazard to loss of life downstream of the dam from that which would exist just prior to failure. Therefore, the spillway is adjudged to be "seriously inadequate" and the dam is assessed as "unsafe; non-emergency".

Immediately upon receipt of this notification, a system for providing around-the-clock surveillance of the dam during periods of unusually heavy precipitation should be developed and implemented. An emergency action plan for the notification and evacuation of downstream residents should also be developed.

It is recommended that within 3 months of the date of notification of the owner, a hydrologic/hydraulic investigation of the structure should be commenced. Mitigating measures for increased spillway capacity deemed necessary as a result of the investigations should be completed within 18 months.

Several other deficiencies were noted on this structure. These deficiencies should be corrected within 12 months of the date of notification of the owner. Among the required actions are the following:

1. Cut brush, trees, and weeds growing on the dam embankment.

2. Flatten embankment slopes, especially the seriously oversteepened segment near the site of the old hydro-electric plant.

3. Drain the small pool beyond the downstream toe of the dam and keep the soft area under surveillance.

4. Fill the gaps between the three pipe-arches and the downstream headwall.

5. Repair the cracks and small voids in the downstream headwall.

6. Fill the voids on the crest and under the downstream end of the concrete apron.

7. Make the reservoir drain operational.

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved by:

Richard E. Mayo, LTC, CE
for Col. W. M. Smith Jr.
New York District Engineer

Date: 18 SEP 1981

OVERVIEW
GARNET LAKE DAM
I.D. NO. NY1167

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
GARNET LAKE DAM
I.D. NO. NY1167
#186-574 UPPER HUDSON RIVER BASIN
WARREN COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Garnet Lake Dam is a composite structure with the lower portion consisting of concrete and stone and the upper portion formed by an earth roadway embankment. The spillway for the dam consists of three ungated corrugated steel pipe-arch culverts.

The dam is about 160 feet long and 15 feet high. The crest is 18.5 feet wide. A paved local road crosses the crest of the dam. The stone and concrete portion composes the lower 9 feet of the structure while the earth fill makes up the upper 6 feet. Some earth fill from the roadway covers the concrete and stone on both the upstream and downstream faces at either end of the spillway.

The spillway consists of three 44 inch by 72 inch bitumenous coated corrugated steel pipe-arch culverts located near the middle of the dam. The pipes are 20 feet long and there are concrete headwalls at both ends of the pipe. There are provisions for stop logs on the upstream end of each of the pipes. The pipes outlet onto a concrete apron structure which is about 10 feet wide. At the end of the apron there is a 3 foot drop to boulders in the outlet stream plunge pool area.

There is a reservoir drain believed to be an 8 to 10 inch diameter pipe, extending through the base of the dam. The control mechanism for this pipe i attached ') the headwall at the upstream end of the spillway.

b. Location

This dam is located on Garnet Lake Road in the Town of Johnsburg, Warren County. The dam is at the northeast end of Garnet Lake. It is approximately 7 miles southwest of the hamlet of Weavertown and six miles south of New York State Route 8.

c. Size Classification

This dam is 15 feet high and has a storage capacity of 2464 acre-feet. Therefore, the dam is in the intermediate size category as defined by the "Recommended Guidelines for Safety Inspection of Dams".

d. Hazard Classification

This dam is classified as "high" hazard due to the presence of six houses and mobile homes downstream of the dam including several immediately adjacent to the stream channel.

e. Ownership

The lower portion of this dam is owned by the Garnet Lake Civic Association. The Town of Johnsburg owns and maintains the upper portion of the dam including the roadway which runs along the crest of the dam and the three spillway pipes. The contact person for the Civic Association is their attorney, Mr. Edward Stewart, Box 2, Circle Avenue, North Creek, New York 12853. His office phone number is (518) 251-2221. The Town of Johnsburg's Supervisor is Mr. Sterling Goodspeed. His address is Town Hall, North Creek, New York 12853.

f. Purpose of Dam

This dam is used to maintain the level of Garnet Lake for recreational purposes.

g. Design and Construction History

This dam was originally constructed in 1853. It was extensively reconstructed in or about 1913 for the North Creek Electric Company. The structure was reconstructed into its present configuration in the early 1950's. At that time, members of the Civic Association replaced the existing timber crib dam with a concrete and stone structure. The Town rebuilt the roadway and installed the three spillway culvert pipes at the same time.

h. Normal Operating Procedures

The only operation procedure on this structure is the installation of one stop log at the upstream end of each of the three culvert pipes in late May of each year. These stop logs are then removed in early September.

1.3 PERTINENT DATA

a. Drainage Area (sq.mi.)	8.62

b. Discharge at Dam (cfs)

Three pipe-arches - Water Surface at Top of Dam	420

c. Elevation (USGS Datum)

Top of Dam	1466.9
Invert of Pipe-Arches	1462.0
Invert of Reservoir Drain	Unknown

d. Reservoir - Surface Area (acres)

Top of Dam	287+
Invert of Pipe Arches	287

e. Storage Capacity (acre-feet)

Top of Dam	2464
Invert of Pipe Arches	957

f. Dam

Type - Concrete and stone structure with earth fill on top; asphalt road runs along crest.

Dam length (ft)	160
Crest Width (ft)	18.5

g. Spillway

Type: Three 44 inch by 72 inch bituminous coated and paved corrugated steel pipe arches, each 20 feet long; concrete headwalls on both ends of pipes; concrete apron structure extends 10 feet beyond downstream end of pipes; vertical drop of 3 feet to boulders at end of apron.

h. Reservoir Drain

Type: Reported to be an 8-10 inch pipe through base of dam.

Control: Control mechanism attached to upstream headwall to spillway pipes; drain has not been operated in many years.

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

The Garnet Lake Dam is located in the Adirondack Highlands physiographic province of New York State. The original rock was sedimentary with large intrusions of igneous rocks (anorthosites, granites, gabbros). Much of this rock has been metamorphosed by heat, pressure, folding and faulting. Surface features of the rock reflects the effects of glaciation.

The surficial soils are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

b. Subsurface Investigations

There are no records of any subsurface investigations which were performed for this structure. It was reported in an inspection report dated 1925 that the foundation of the dam consisted of boulders and hardpan.

2.2 DESIGN RECORDS

No design records for the original construction or any of the subsequent reconstructions were available.

2.3 CONSTRUCTION RECORDS

No detailed construction records were available for this dam. A sketch of the dam, prepared in 1913, was available. It was not included in the appendix of this report since the dam was extensively reconstructed in the early 1950's and it no longer resembles the sketch.

The last major modifications to the structure were those made in the Fifties. At that time, the Town of Johnsburg reconstructed the road on top of the dam and installed the three spillway pipes.

2.4 OPERATION RECORDS

There are no operation records maintained on this dam.

2.5 EVALUATION OF DATA

Data used for the preparation of this report was obtained from the Department of Environmental Conservation files, from measurements taken at the time of the inspection and from discussions with Mr. Paul Scott of the Civic Association. The information available was limited and analyses performed for this report were based primarily on the measurements made at the time of the inspection.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Garnet Lake Dam was conducted on July 28,1981. The weather was sunny and the temperature was around 70 degrees. At the time of the inspection, the water was at the level of the top of the stoplogs on the spillway pipes.

b. Dam

Visual inspection revealed several deficiencies on this structure. There was extensive growth of brush, trees, and weeds on the downstream slope which prevented a detailed visual inspection of the slope. Some brush was growing on the upstream slope as well. Both the upstream and downstream slopes of the earth fill were fairly steep (approximately 1 vertical on 2 horizontal). There was one segment of the downstream slope which was even steeper (1V on 1H). This segment was to the left of the spillway section and was originally the site of a hydroelectric plant. No remains of the plant were visible.

The embankment portion is composed of sand and gravel which also make up the roadway. There was up to 9 inches of asphalt pavement on the crest. There were two voids in the crest immediately above the spillway pipes, one at either end of the pipes. The void on the downstream end was the largest. It was approximately 1 foot in diameter and 2 feet deep. This void was being repaired at the time of the inspection.

One soft area was noted beyond the downstream toe. This area was to the left of the spillway section and approximately in line with the old power house. A pool approximately 20 feet in diameter had formed adjacent to the normal stream channel. There was no actual seepage in this area and it is possible that the pool is the result of backwater from the stream channel.

c. Spillway

Several deficiencies were noted on the spillway section. The three pipe-arches were in satisfactory condition. The bituminous coating material had been removed from the lower portion of each of the pipes and there was some minor rusting noted in these unprotected areas. There were 3 inch wide gaps between the downstream concrete headwall and the crowns of all three pipes. There were also several other large cracks in this headwall. Cracks up to 3 inches wide were noted in the concrete between and above the pipes. There were small areas of concrete removal in the wall at the lower corners of each of the pipe-arches.

The concrete on the downstream apron is in good condition with no cracking or deterioration noted. There were 1 inch wide cracks with some concrete loss along the base of the side walls at either end of the apron. Large boulders were exposed beneath the downstream end of the apron. There were two small voids which extended for up to 1 foot under the downstream toe.

d. Reservoir Drain

The reservoir drain is reported to be an 8-10 inch pipe through the base of the dam. The control mechanism for the valve on this pipe is located on the upstream headwall. This valve reportedly has not been operated in over twenty years. The outlet of the pipe could not be located.

e. Reservoir

The slopes adjacent to the lake were fairly steep and forested. There were no signs of soil instability in the reservoir area.

f. Downstream Channel

The channel downstream of the dam is lined with brush and trees. There are numerous boulders in the channel. Some of these boulders have been placed across the stream channel, approximately 30 feet downstream of the dam, forming a pool.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection revealed several deficiencies on this structure. The following items were noted:

1. Brush, trees and weeds growing on the dam embankment preventing a detailed inspection of the dam.
2. Embankment slopes which were fairly steep including one seriously oversteepened segment (site of an old hydroelectric plant).
3. Voids in the crest immediately above the spillway pipes.
4. A soft area at the edge of a 20 foot diameter pool beyond the downstream toe of the dam.
5. Gaps between each of the three pipe-arches and the downstream headwall.
6. Cracks and small voids in the downstream headwall.
7. Small voids under the downstream end of the concrete apron.
8. A reservoir drain pipe which is probably inoperable.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURE

4.1 PROCEDURES

Normal operation is to allow water to flow through the ungated spillway pipes. One 10 inch stop log is placed across the inlet at each of the three pipes each year in late May. These boards can then be removed, one at a time during dry summers to provide a flow of water in the downstream channel. The normal schedule is to remove the stop logs each year in early September and allow the water surface to drop.

4.2 MAINTENANCE OF DAM

Some maintenance work is performed on the dam by the Town of Johnsburg. The dam is also inspected occasionally by representatives of the Civic Association.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system for the evacuation of downstream residents is present.

4.4 EVALUATION

The operation procedures for this dam are satisfactory. Increased maintenance efforts are needed to repair the deficiencies noted in Section 3.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed for Garnet Lake was made using the USGS 15 minute quadrangle sheets for Thirteenth Lake, North Creek, Harrisburg, and Lake Luzerne, New York. The 8.62 square mile drainage area consists primarily of forested lands. There are two ponds, Round Pond and Mud Pond in the upper portion of the drainage area. Relief in the watershed is very steep with slopes ranging from 20% to 40%. Mountains within the drainage area rise to 1500 feet above the reservoir level.

5.2 ANALYSIS CRITERIA

The anlysis of the floodwater retarding capability was made using the Corps of Engineers HEC-1 computer program, Dam Safety version. This program uses the Snyder Synthetic Unit hydrograph and the "Modified Puls" flood routing procedure. The spillway design flood selected for analysis was the Probable Maximum Flood (PMF) in accordance with the recommended guidelines of the U.S. Army Corps of Engineers. The PMF event is that hypothetical storm event resulting from the most critical combination of rainfall, minimum soil retention and direct runoff that is considered reasonably possible for a particular watershed.

5.3 SPILLWAY CAPACITY

The spillway for this structure consists of three 44 inch by 72 inch pipe-arches located in the center of the upper portion of the dam. The pipe-arches operate as culverts under inlet control conditions. Normal operation procedures are to put one stop log across the base of each pipe-arch to maintain a higher water surface from late May to early September. For the purposes of this analysis, it was assumed that no stop logs were in place and that the initial water surface was at the pipe-arch inverts.

The flood analysis performed for this dam indicates that the spillway does not have sufficient capacity for discharging one-half the PMF. For this storm event, the peak inflow is 4933 cfs and the peak outflow is 2692 cfs. The PMF peak inflow is 9866 cfs and the peak outflow is 7756 cfs. The capacity of the three pipe-arches with the water surface at the top of the dam is 420 cfs.

5.4 RESERVOIR CAPACITY

The stage-storage information available on this structure is very limited. Based on planimetered areas, the surcharge storage capacity between the invert of the pipe-arches and the top of the dam is 1507 acre-feet. This is equivalent to a direct runoff depth of 3.3 inches over the watershed.

5.5 FLOODS OF RECORD

No records were available regarding the flood of record.

5.6 OVERTOPPING POTENTIAL

Analysis using the PMF and one-half the PMF storm events indicates that the dam does not have sufficient spillway capacity. The computed depths of overtopping for these two events are 4.09 feet and 1.84 feet respectively. All storm events exceeding 26% of the PMF will result in the dam being overtopped.

5.7 Using the Corps of Engineer's screening criteria for initial review of spillway adequacy, it has been determined that the dam would be overtopped by all storms exceeding 26% of the PMF. Since a failure of this embankment dam would increase the hazard to downstream residents over that which would exist just prior to the failure, the spillway capacity is adjudged as seriously inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations of the structure revealed several deficiencies. Extensive growth of brush and trees prevented a detailed inspection of the slopes. Both the upstream and downstream slopes were fairly steep. One segment of the downstream slope was steeper than a 1 vertical on 1 horizontal. This was the site of an old hydro-electric plant.

There were several deficiencies noted on the spillway section. There was a 3 inch gap between the crown of each of the pipe-arches and the downstream headwall. Several cracks and small voids were also noted on this headwall.

b. Design and Construction Data

No design or construction information was available concerning this structure. Due to the lack of data and due to the unusual composition of the structure (the lower portion concrete and stone and the upper portion earth fill) a stability analysis was not done.

c. Seismic Stability

This dam is located in Seismic Zone 2. Due to the composition of the structure, no seismic stability analysis was performed.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Garnet Lake Dam revealed that the spillway capacity is seriously inadequate and outflows from all storms exceeding 26% of the Probable Maximum Flood would overtop the dam. A dam break analysis indicates that an overtopping induced failure would significantly increase the hazard to loss of life downstream of the dam. Therefore, the spillway is adjudged as seriously inadequate and the dam is assessed as unsafe, non-emergency.

The inspection also revealed several other deficiencies which affect the safety of this structure. Among these were a seriously oversteepened section of the downstream slope of the embankment and cracks in the downstream concrete headwall for the three spillway pipe-arches.

b. Adequacy of Information

The information which was available for the preparation of this report was quite limited. Sketches developed from field measurements taken at the time of inspection were used for the hydrologic/hydraulic analysis. Other data such as stage-storage curve was estimated based on available information.

c. Need for Additional Investigations

Since the spillway has been assessed as seriously inadequate, additional hydrologic/hydraulic investigations are required to more accurately determine the site specific characteristics of the watershed. Analyses will then be required to determine how to provide the additional spillway capacity needed.

d. Urgency

The additional hydrologic and hydraulic investigations which are needed should be commenced within 3 months of the date of notification. Other deficiencies should be corrected within 12 months.

7.2 RECOMMENDED MEASURES

a. After the hydrologic/hydraulic investigation has been completed, mitigating measures dealing with the seriously inadequate spillway should be undertaken.

b. Brush, trees and weeds growing on the dam embankment should be cut to permit a more detailed inspection of dam.

c. The embankment slopes should be flattened with special attention given to the seriously oversteepened segment near the site of the old hydro-electric plant.

d. The pool beyond the downstream toe of the dam should be drained and the soft area at the toe should be kept under surveillance.

e. The gaps between the three pipe-arches and the downstream headwall should be filled.

f. The cracks and small voids in the downstream headwall should be filled.

g. The voids on the crest of the dam immediately above the spillway pipes should be filled.

h. Voids under the downstream end of the concrete apron should be repaired.

i. The reservoir drain should be made operational.

j. An emergency action plan for the notification and evacuation of downstream resident should be developed.

APPENDIX A

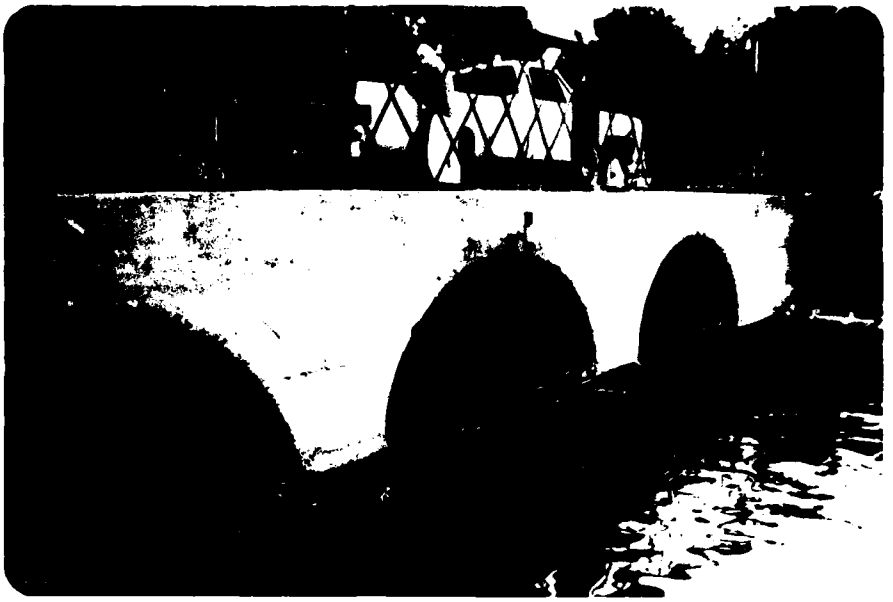
PHOTOGRAPHS

UPSTREAM SLOPE AND CREST OF DAM
NOTE ROAD ALONG THE CREST

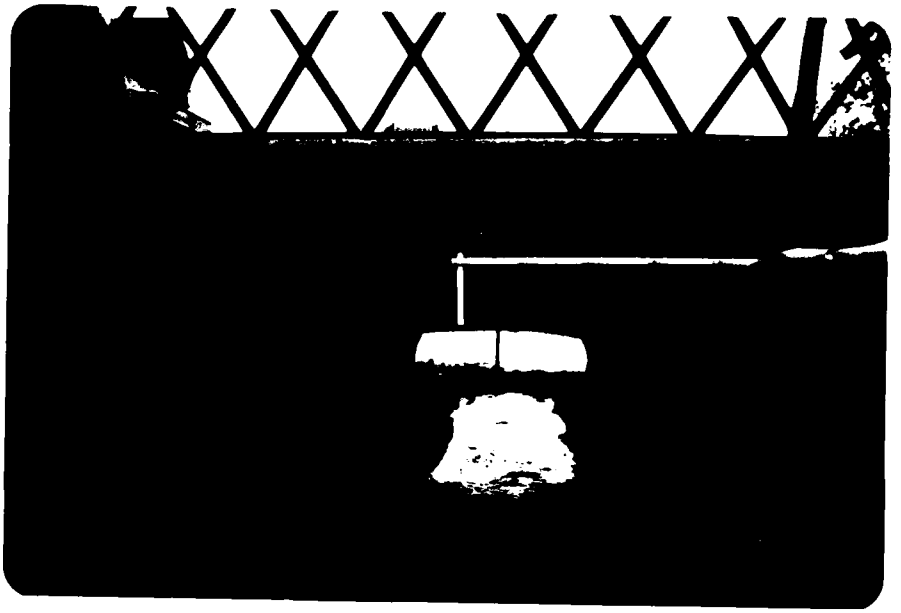
VOID IN CREST ABOVE SPILLWAY PIPES
VOID WAS BEING FILLED AT TIME OF INSPECTION

BRUSH AND TREES GROWING ON DOWNSTREAM SLOPE
IN AREA OF OLD HYDROELECTRIC PLANT

SECTION OF OVERSTEEPENED SLOPE WHERE
HYDROELECTRIC PLANT USED TO BE LOCATED

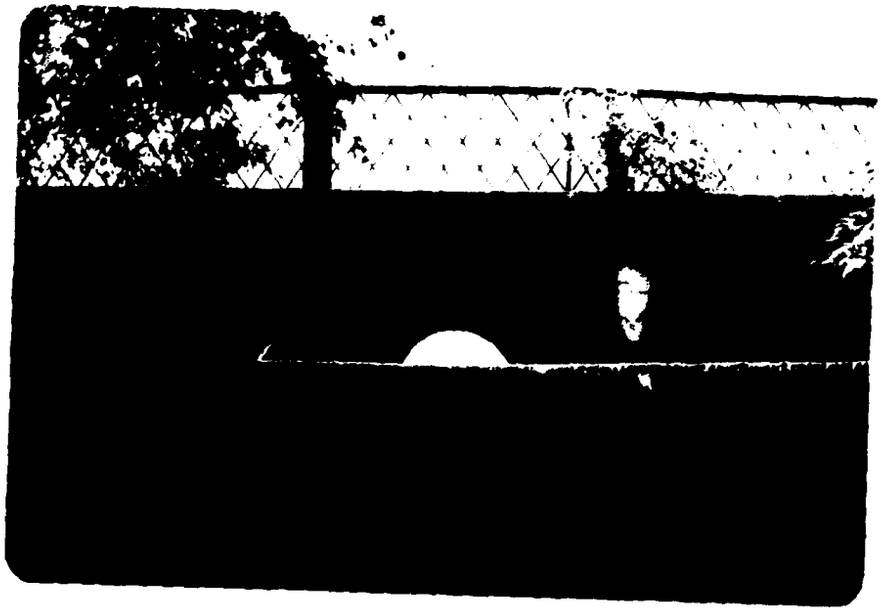


UPSTREAM HEADWALL TO PIPE-ARCHES;
NOTE CONTROL MECHANISM FOR RESERVOIR DRAIN



SEPARATION OF 3 INCHES BETWEEN
DOWNSTREAM HEADWALL AND CENTER PIPE ARCH

SPILLWAY PIPE-ARCHES AND CONCRETE APRON;
NOTE VOID UNDER APRON AT RIGHT SIDE OF PICTURE



CRACKS IN DOWNSTREAM HEADWALL

APPENDIX B

VISUAL INSPECTION CHECKLIST

33-15-3(3/80)

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam GARNET LAKE DAM

Fed. I.D. # NY 1167 DEC Dam No. 186-574

River Basin UPPER HUDSON

Location: Town JOHNSBURG County WARREN

Stream Name MILL CREEK

Tributary of ——

Latitude (N) 43° 32.3′ Longitude (W) 74.° 00.7′

Type of Dam STONE & CONCRETE & EARTH

Hazard Category

Date(s) of Inspection 7/28/81

Weather Conditions 70° SUNNY

Reservoir Level at Time of Inspection 4.15′ BELOW TOP OF DAM (AT TOP OF STOPLOGS)

b. Inspection Personnel R.L. WARRENDER, W.C. LYNICK

c. Persons Contacted (Including Address & Phone No.)

ED STEWART - ATTORNEY FOR CIVIC ASSOCIATION & TOWN OF JOHNSBURG

PAUL SCOTT - MEMBER OF GARNET LAKE CIVIC ASSOCIATION

d. History:

Date Constructed 1913 Date(s) Reconstructed 1950±

Designer

Constructed By MEMBERS OF CIVIC ASSOCIATION & TOWN OF JOHNSBURG

Owner GARNET LAKE CIVIC ASSOCIATION - OWNER OF LOWER PORTION OF DAM
TOWN OF JOHNSBURG - OWNER OF UPPER PORTION OF DAM

33-15-3(9/80)

2) Embankment

a. Characteristics

(1) Embankment Material SAND & GRAVEL FORMING ROADWAY
9" THICK ASPHALT PAVEMENT ON CREST

(2) Cutoff Type NONE

(3) Impervious Core NONE

(4) Internal Drainage System NONE

(5) Miscellaneous PAVED ROADWAY OVER TOP OF DAM - 3 PIPE ARCH SPILLWAY CULVERTS THROUGH DAM

b. Crest

(1) Vertical Alignment SATISFACTORY

(2) Horizontal Alignment SATISFACTORY

(3) Surface Cracks NONE - THERE WERE 2 VOIDS ABOVE SPILLWAY PIPES ONE AT UPSTREAM & ONE AT DOWNSTREAM - DOWNSTREAM VOID IS BIGGER (C) [redacted] 1 FT. DIAMETER BY 2 FT DEEP - IT WAS BEING FILLED AT TIME OF INSPECTION

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1 ON 1½

(2) Undesirable Growth or Debris, Animal Burrows SOME BRUSH ON LEFT END

(3) Sloughing, Subsidence or Depressions SOME MINOR SURFACE EROSION OF THE SAND & GRAVEL AT RIGHT END

(4) Slope Protection SOME RIP RAP IN SEVERAL ISOLATED LOCATIONS

(5) Surface Cracks or Movement at Toe NO

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 ON 1½ OR STEEPER

(2) Undesirable Growth or Debris, Animal Burrows SUBSTANTIAL GROWTH OF TREES ON RIGHT END - BRUSH & WEEDS ON LEFT END

(3) Sloughing, Subsidence or Depressions ONE OVERSTEEPENED AREA (1V:1H) TO LEFT OF SPILLWAY - SLOPE IS 1 ON 1 OR STEEPER IT IS REPORTEDLY SITE OF OLD HYDROELECTRIC MILL

(4) Surface Cracks or Movement at Toe NONE

(5) Seepage ONE SOFT AREA NOTED IN LINE WITH OLD MILL STRUCTURE - BEYOND TOE OF DAM 20 FT DIA. POOL NO SEEPAGE OBSERVED BUT POOL IS FULL - COULD BE FROM STREAM CHANNEL

(6) External Drainage System (Ditches, Trenches; Blanket) NONE

(7) Condition Around Outlet Structure SOME SCOUR AT END OF SPILLWAY STRUCTURE

(8) Seepage Beyond Toe

e. Abutments - Embankment Contact

SATISFACTORY

33-15-3(9/80)

(1) Erosion at Contact NONE

(2) Seepage Along Contact NONE

3) Drainage System

a. Description of System NONE

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

NONE

93-15-3(9/80)

5) Reservoir

a. Slopes STEEP FORESTED TO EDGE OF RESERVOIR

b. Sedimentation NONE

c. Unusual Conditions Which Affect Dam NONE

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) 6 HOUSES & TRAILERS WITH SEVERAL RIGHT ON STREAM CHANNEL

b. Seepage, Unusual Growth NONE

c. Evidence of Movement Beyond Toe of Dam NONE

d. Condition of Downstream Channel BOULDERS - SOME LINED ACROSS CHANNEL TO FORM PLUNGE POOL - TREES TO EDGE OF CHANNEL

7) Spillway(s) (Including Discharge Convevance Channel)

3 - 44" x 72" PIPE-ARCHES NEAR CENTER OF DAM - THROUGH UPPER ROADWAY PORTION - HEADWALLS AT UPSTREAM & DOWNSTREAM ENDS

a. General 1 STOP LOG IN PLACE ACROSS UPSTREAM END OF EACH PIPE-ARCH - CONCRETE APRON GRAVITY STRUCTURE AT DOWNSTREAM END OF PIPES

b. Condition of Service Spillway BITUMINOUS MATERIAL REMOVED ALONG FLOWLINE FOR ENTIRE LENGTH OF PIPES - SOME MINOR RUSTING OF PIPES IN SPOTS WHERE BITUMINOUS MATERIAL HAS BEEN REMOVED. BITUMINOUS PAVING - RELATIVELY INTACT ALONG PIPE INVERT; BITUMINOUS COATING ON UPPER PORTION OF ALL PIPES - SATISFACTORY

c. Condition of Auxiliary Spillway NONE

d. Condition of Discharge Conveyance Channel WATER FLOWS FROM PIPES ONTO CONCRETE APRON THEN OVER A 3' DROP TO BOULDERS APRON IN GOOD CONDITION - SOME MINOR VOIDS UNDER DOWNSTREAM TOE OF APRON - CREATING SMALL UNSUPPORTED AREAS

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other UNKNOWN

Size: 8"-10" (BELIEVED TO BE THIS SIZE

Invert Elevations: Entrance UNKNOWN Exit _____

Physical Condition (Describe): Unobservable ✓

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve ✓ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): CONTROL MECHANISM ON UPSTREAM HEADWALL IN FRONT OF MIDDLE PIPE - GATE HAS NOT BEEN OPENNED IN 20 YEARS - PROBABLY INOPERABLE OUTLET COULD NOT BE LOCATED

93-15-3(9/80)

9) Structural

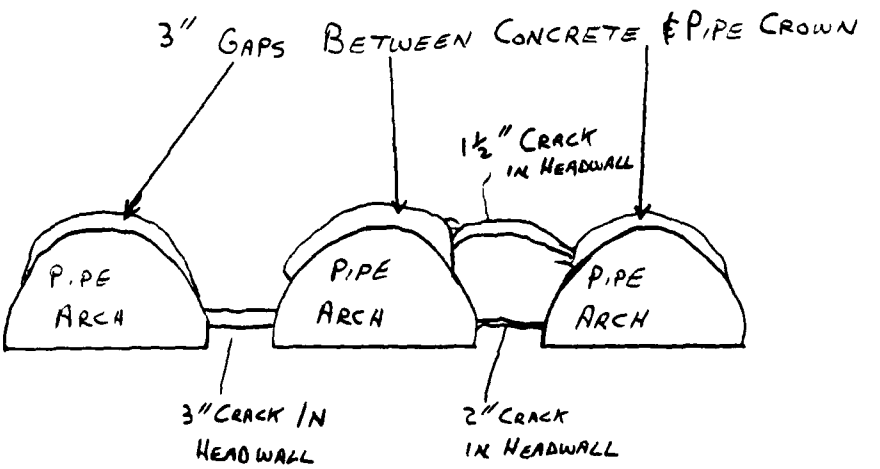
a. Concrete Surfaces SATISFACTORY- NO SPALLING OR SURFACE DETERIORATION NOTED

b. Structural Cracking SERIOUS CRACKING ON DOWNSTREAM HEADWALL CRACKS OF UP TO 3" IN WIDTH NOTED (SEE DIAGRAM BELOW)

c. Movement - Horizontal & Vertical Alignment (Settlement) MOVEMENT OF DOWNSTREAM HEADWALL HAD RESULTED IN 3" GAPS BETWEEN PIPE CROWN & THE WALL

d. Junctions with Abutments or Embankments 1" CRACKS NOTED BETWEEN DOWNSTREAM APRON & SIDEWALLS - SOME LOSS OF CONCRETE IN THIS AREA

CONDITION OF DOWNSTREAM HEADWALL



h. Joints - Construction, etc. NONE

i. Foundation GOOD

j. Abutments OKAY

k. Control Gates UNOBSERVABLE

l. Approach & Outlet Channels SATISFACTORY

m. Energy Dissipators (Plunge Pool, etc.) BOULDERS - DOWNSTREAM OF APRON

n. Intake Structures UPSTREAM HEADWALL IN GOOD CONDITION NO CRACKING OR SEPARATION

o. Stability

p. Miscellaneous

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

a. Description and Condition

HYDROELECTRIC STATION - USED TO BE ON LEFT OF SPILLWAY - NO LONGER ANY TRACE OF THE BUILDING OR FOUNDATION - ALL THAT REMAINS IS AN OVERSTEEPENED SECTION OF SLOPE

11) Operation Procedures (Lake Level Regulation):

1 STOP LOG ~~S~~ IS PUT IN FRONT OF EACH OF PIPE ARCHES TOWARDS END OF SPRING RUN OFF (CAPE MAP) - THIS HOLDS TO WATER SURFACE UP ABOUT 10". THEY CAN THEN BE REMOVED TO ALLOW A FLOW OF WATER IN THE DOWNSTREAM CHANNEL - THE BOARDS ARE REMOVED AFTER LABOR DAY & THE WATER LEVEL USUALLY FALLS BY LATE OCTOBER

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1466.9	287	2464
2) Design High Water (Max. Design Pool)	—		
3) Auxiliary Spillway Crest	—		
4) Pool Level with Flashboards	—		
5) Service Spillway Crest	1462.0	287	957

DISCHARGES

	Volume (cfs)
1) Average Daily	—
2) Spillway @ Maximum High Water	420
3) Spillway @ Design High Water	—
4) Spillway @ Auxiliary Spillway Crest Elevation	—
5) Low Level Outlet	UNKNOWN
6) Total (of all facilities) @ Maximum High Water	420
7) Maximum Known Flood	—
8) At Time of Inspection	1-2 cfs

CREST: ELEVATION: 1466.9

Type: PAVED ROADWAY

Width: 20.5' Length: 165'

Spillover THREE PIPE-ARCHES

Location UPPER MIDDLE PORTION OF DAM

SPILLWAY:

SERVICE		AUXILIARY
1462	Elevation	
3 44"x72" PIPE ARCHES	Type	
—	Width	
	Type of Control	
V	Uncontrolled	
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : NONE

Location: —

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: NONE

_____

Method of Controlled Releases (mechanisms):

RESERVOIR DRAIN PIPE - ALTHOUGH IT IS BELIEVED TO BE INOPERABLE

DRAINAGE AREA: 8.62 SQ MI 5520 ACRES

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: FOREST

Terrain - Relief: STEEP - MOUNTAINOUS

Surface - Soil: THIN TILL OVER ROCK

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

NONE

Potential Sedimentation problem areas (natural or man-made; present or future)

NONE

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

NONE - ONE SMALL POOL NEAR DOWNSTREAM TOE CAUSED BY BACKWATER

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: NONE

Elevation: _____

Reservoir:

Length @ Maximum Pool — (Miles)

Length of Shoreline (@ Spillway Crest) — (Miles)

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
GARNET LAKE DAM NY1167	1		
SUBJECT		**COMPUTED BY**	**DATE**
WATERSHED PARAMETERS		RLW	8/3/81

SNYDER SYNTHETIC UNIT HYDROGRAPH PARAMETERS

- $L = (6.2\ IN)\left(\frac{5280\ FT}{1\ IN}\right) = 32302\ FT \Rightarrow 6.12\ MI.$

$L_{CA} = (3.0\ IN)\left(\frac{5280\ FT}{1\ IN}\right) = 15630\ FT \Rightarrow 2.96\ MI.$

USE $C_T = 2.025$ TO ACCOUNT FOR STORAGE IN ROUND POND & MUD POND UPSTREAM OF THE DAM

LAG TIME (HRS): $t_p = C_t (L \times L_{CA})^{0.3}$

$= 2.025 (6.12 \cdot 2.96)^{0.3} = 4.83$ HRS

UNIT RAINFALL DURATION (HRS): $t_r = \frac{t_p}{5.5}$

$t_r = \frac{4.83}{5.5} = 0.88 \leftarrow$ USE 0.50 HRS

ADJUSTED LAG TIME (HRS): $TP = t_p + 0.25(t_r - t_r)$

$= 4.83 + 0.25(0.50 - 0.88)$

$TP = 4.74$

PEAKING COEFFICIENT

USE $C_p = 0.625$

RAINFALL - PMF

REF: HMR #33 ZONE 1 INDEX PMP = 17.5"

ADJUSTMENT FOR TIME & DA	DURATION	6	12	24	48 HRS
	% OF INDEX	111	123	132	142

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
GARNET LAKE DAM NY 1167	2		
SUBJECT		**COMPUTED BY**	**DATE**
WATERSHED PARAMETERS		RLW	8/3/81

DRAINAGE AREA - TAKEN FROM 4 - 15 MINUTE USGS QUAD SHEETS

QUAD NAMES - THIRTEENTH LAKE

NORTH CREEK

HARRISBURG

LAKE LUZERNE

PLANIMETERED AREA MAP SCALE 1" = 5210 FT

$8.86\ IN^2 \left(\frac{5210^2 - 5280^2}{43560}\right) = 5520$ ACRES $\Rightarrow 8.62$ SQ. MI.

BASE FLOW:

INITIAL AT 1 CSM = 8 CFS

QRCSN = .1 (10% OF PEAK Q)

RTIOR = 1.5

LOSSES (SOIL INFILTRATION)

INITIAL 1.0 CONSTANT 0.1

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB		SHEET NO.	CHECKED BY	DATE
GARNET LAKE DAM	NY 1167	3		
SUBJECT			COMPUTED BY	DATE
HYDRAULIC COMPUTATIONS			RLW	8/3/81

STAGE STORAGE DATA

REF: USGS 15 MINUTE QUADRANGLE - THIRTEENTH LAKE

PLANIMETERED SURFACE AREA (ELEV. 1462) = 0.46 IN^2 = 287 ACRE

PLANIMETERED 1480 CONTOUR = 0.82 IN^2 - 0.09 IN^2 = 0.73 IN^2 = 455 ACRE
↓
MAP IN GROUND

SPILLWAY DISCHARGE CAPACITY

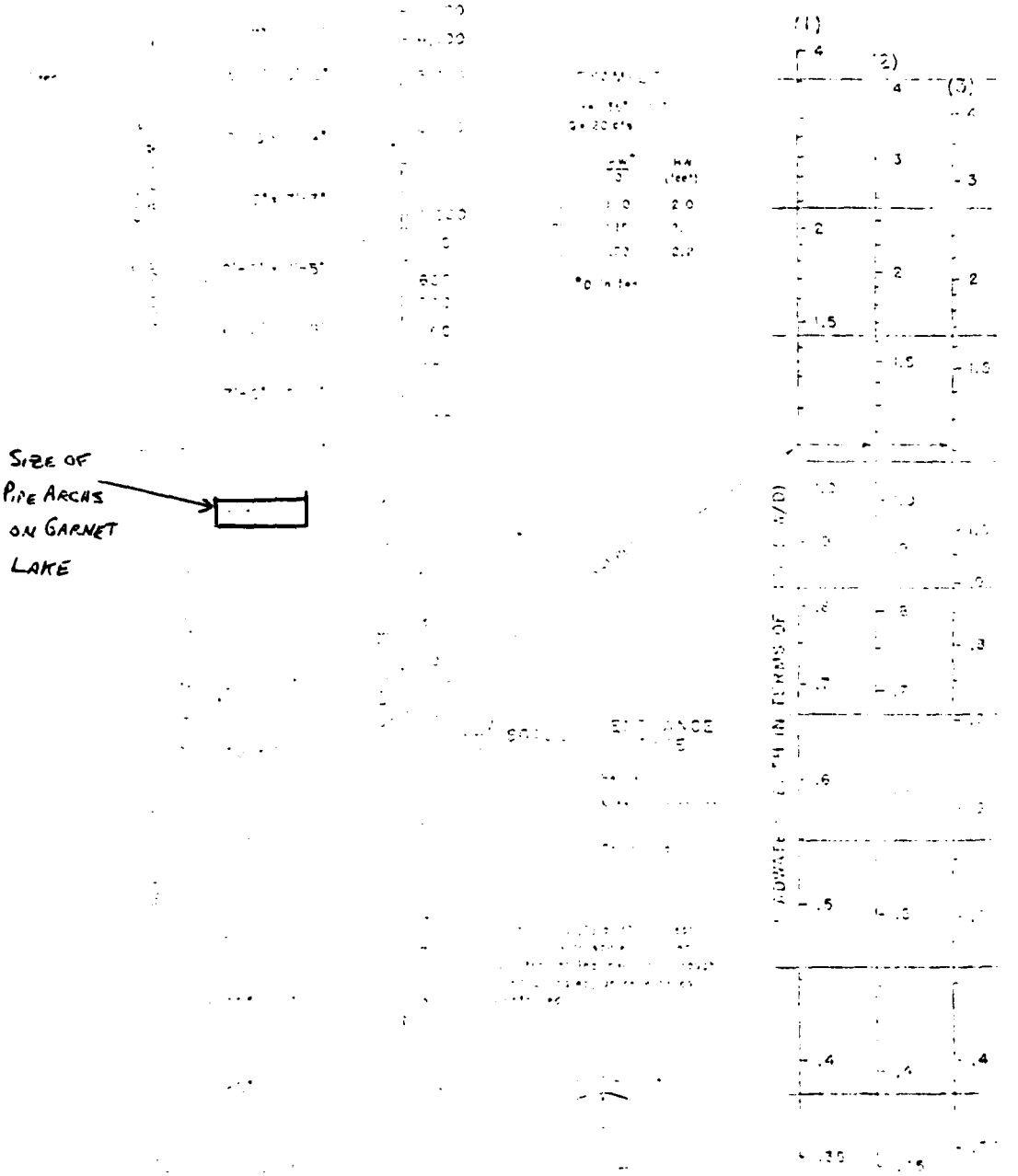
THREE PIPE-ARCHS EACH ONE 44" X 72"

INVERT ELEVATION THE SAME FOR EACH PIPE
ASSUMED TO BE LAKE LEVEL (USGS ELEV. = 1462)

CAPACITY CALCULATIONS BASED ON NOMOGRAPH ON FOLLOWING PAGE

ELEV.	HW/D	DISCHARGE (cfs)	TOTAL DISCHARGE 3 PIPES (cfs)
1462	0	0	0
1464	.545	40	120
1465	.818	76	228
1466	1.09	110	330
1466.9	1.34	140	420

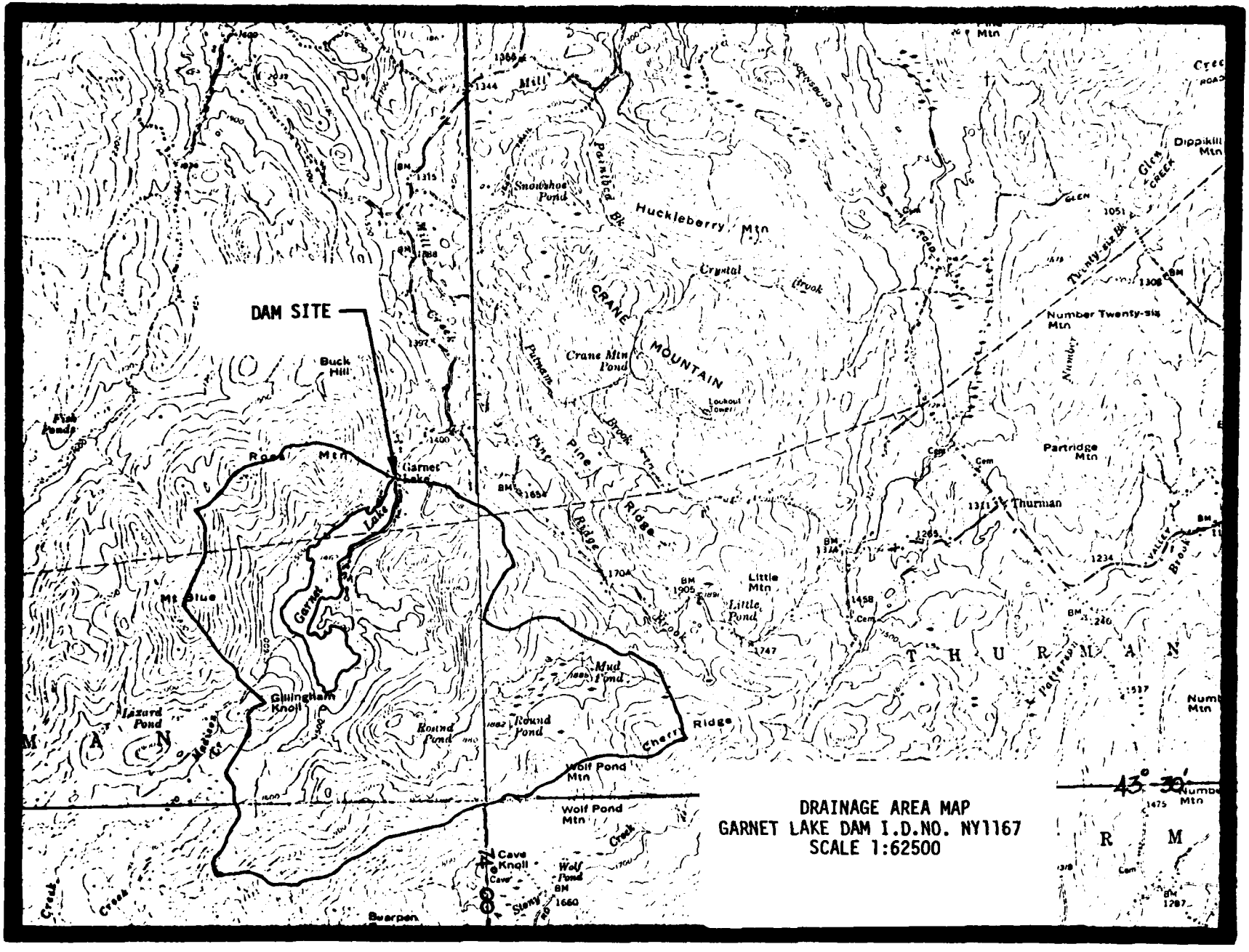
CHART 6



SIZE OF PIPE ARCHS ON GARNET LAKE

EADWATER DEPTH FOR
C. M. PIPE-ARCH CULVERTS
WITH INLET CONTROL

REF: FHWA HEC No. 5 12/65
"HYDRAULIC CHARTS FOR THE SELECTION OF HIGHWAY CULVERTS"



DRAINAGE AREA MAP
GARNET LAKE DAM I.D.NO. NY1167
SCALE 1:62500

```
**********
HECCO HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********

     1                A1 GARNET LAKE DAM  NY 1167
     2                A2 HYDROLOGY AND HYDRAULICS ANALYSIS
     3                A3 PMF ANALYSIS
     4                B    150       0      30       0       0       0       0       0       0       0
     5                B1     5
     6                J      1       4       1
     7                J1   .26     .27     .50     1.0
     8                K      0       1                                               1
     9                K1 INFLOW HYDROGRAPH
    10                M      1       1    8.62                                                       1
    11                P             17.5     111     123     132     142
    12                T                                                       1.0     0.1
    13                M   4.74    .625
    14                K      8      -.1     1.5
    15                K      1       1                             2               1
    16                K1 ROUTED HYDROGRAPH
    17                Y                                     1       1
    18                Y1     1                                                 -1462      -1
    19                Y4  1462    1464    1465    1466  1466.9
    20                Y5     0     100     220     330     420
    21                $A     0     267     455
    22                $E  1452    1462    1480
    23                $$  1462
    24                $D1466.9     3.1     1.5     270
    25                K     99
    26                A
    27                A
    28                A
    29                A
    30                A

                      NEW YORK STATE
                      DEPT OF ENVIRONMENTAL CONSERVATION
                      FLOOD PROTECTION BUREAU
```

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
**********************************

                                        **********************************
                                        NEW YORK STATE
                                        DEPT OF ENVIRONMENTAL CONSERVATION
                                        FLOOD PROTECTION BUREAU
                                        **********************************

 RUN  DATE 08/04/81
                    GARNET LAKE DAM  PY 1167
                    HYDROLOGY AND HYDRAULICS ANALYSIS
                    PMF ANALYSIS

                                    JCR SPECIFICATION
      NQ      NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
     150       0       30        0       0        0        0        0        0        0
                              JOPER      NWT    LROPT    TRACE
                                  5        0        0        0

                          MULTI-PLAN ANALYSES TO BE PERFORMED
                              NPLAN= 1 NRTIO= 4 LRTIO= 1
                RTIOS=   0.26    0.27    0.50    1.00

**********          **********          **********          **********          **********

                                SUB-AREA RUNOFF COMPUTATION

                INFLOW HYDROGRAPH
                          ISTAG   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                              1       0       0       0       0       0       1       0       0

                                    HYDROGRAPH DATA
          IHYDG    IUHG    TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW  ISAME  LOCAL
              1       1    8.62     0.     8.62    0.      0.         0      1      0

                                    PRECIP DATA
                        SPFE     PRS      R6      R12     R24     R48     R72     R96
                        0.     17.50   111.00  123.00  132.00  142.00    0.      0.
TRSPC COMPUTED BY THE PROGRAM IS 0.800

                                    LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.      0.      1.00    0.      0.      1.00    1.00    0.10    0.      0.

                                UNIT HYDROGRAPH DATA
                            TP=  4.71    CP=0.63    NTA=  0

                                RECESSION DATA
                            STRTQ=     8.00    QRCSN=    -0.10    RTIOR= 1.50
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC=10.65 AND R= 8.63 INTERVALS

                UNIT HYDROGRAPH 52 END-OF-PERIOD ORDINATES, LAG=   4.71 HOURS, CP= 0.63  VOL= 1.00
          25.     92.     185.    292.    407.    524.    626.    699.    743.    755.
         727.    662.     585.    525.    467.    416.    371.    330.    294.    262.
         233.    208.     185.    165.    147.    131.    116.    104.     92.     82.
          73.     65.      58.     52.     46.     41.     36.     32.     29.     26.
          23.     20.      18.     16.     14.     13.     11.     10.      9.      8.
           7.      6.
```

1.02	3.00	54	0.04	0.	0.04	31.	1.03	16.30	129	0.	0.	0.	472.
1.02	3.30	55	0.04	0.	0.04	28.	1.03	17.00	130	0.	0.	0.	453.
1.02	4.00	56	0.04	0.	0.04	25.	1.03	17.30	131	0.	0.	0.	435.
1.02	4.30	57	0.04	0.	0.04	22.	1.03	18.00	132	0.	0.	0.	418.
1.02	5.00	58	0.04	0.	0.04	20.	1.03	18.30	133	0.	0.	0.	401.
1.02	5.30	59	0.04	0.	0.04	18.	1.03	19.00	134	0.	0.	0.	385.
1.02	6.00	60	0.04	0.	0.04	16.	1.03	19.30	135	0.	0.	0.	370.
1.02	6.30	61	0.14	0.09	0.05	16.	1.03	20.00	136	0.	0.	0.	355.
1.02	7.00	62	0.14	0.09	0.05	23.	1.03	20.30	137	0.	0.	0.	341.
1.02	7.30	63	0.14	0.09	0.05	38.	1.03	21.00	138	0.	0.	0.	327.
1.02	8.00	64	0.14	0.09	0.05	63.	1.03	21.30	139	0.	0.	0.	314.
1.02	8.30	65	0.14	0.09	0.05	99.	1.03	22.00	140	0.	0.	0.	302.
1.02	9.00	66	0.14	0.09	0.05	145.	1.03	22.30	141	0.	0.	0.	290.
1.02	9.30	67	0.14	0.09	0.05	201.	1.03	23.00	142	0.	0.	0.	278.
1.02	10.00	68	0.14	0.09	0.05	263.	1.03	23.30	143	0.	0.	0.	267.
1.02	10.30	69	0.14	0.09	0.05	329.	1.04	0.	144	0.	0.	0.	257.
1.02	11.00	70	0.14	0.09	0.05	396.	1.04	0.30	145	0.	0.	0.	246.
1.02	11.30	71	0.14	0.09	0.05	461.	1.04	1.00	146	0.	0.	0.	237.
1.02	12.00	72	0.14	0.09	0.05	520.	1.04	1.30	147	0.	0.	0.	227.
1.02	12.30	73	0.78	0.73	0.05	589.	1.04	2.00	148	0.	0.	0.	218.
1.02	13.00	74	0.78	0.73	0.05	694.	1.04	2.30	149	0.	0.	0.	210.
1.02	13.30	75	0.93	0.88	0.05	857.	1.04	3.00	150	0.	0.	0.	201.
									SUM	19.88	16.31	3.57	192541.
										(505.)(414.)(91.)(5452.15)			

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	9866.	8391.	3086.	1336.	192436.
CMS	279.	238.	104.	38.	5449.
INCHES		9.06	15.91	17.30	17.31
MM		230.01	404.09	439.49	439.67
AC-FT		4161.	7310.	7950.	7952.
THOUS CU M		5133.	9017.	9807.	9809.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

2.	2.	2.	2.	2.	2.	2.	2.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	3.	6.	9.	13.	17.	20.	23.
25.	26.	25.	24.	22.	20.	18.	16.	14.	13.
11.	10.	9.	8.	7.	6.	6.	5.	5.	4.
4.	6.	10.	16.	26.	38.	52.	68.	86.	103.
120.	135.	152.	180.	223.	285.	370.	482.	621.	808.
1049.	1325.	1613.	1895.	2153.	2361.	2500.	2565.	2556.	2467.
2310.	2124.	1930.	1737.	1554.	1388.	1240.	1108.	990.	885.
790.	706.	630.	562.	501.	446.	398.	354.	315.	281.
254.	244.	235.	225.	216.	208.	199.	191.	184.	177.
170.	163.	156.	150.	144.	138.	133.	129.	123.	119.
113.	109.	104.	100.	96.	92.	89.	85.	82.	79.
75.	72.	69.	67.	64.	62.	59.	57.	54.	52.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2565.	2182.	958.	347.	50033.
CMS	73.	62.	27.	10.	1417.
INCHES		2.35	4.14	4.50	4.51
MM		59.80	105.06	114.27	114.29
AC-FT		1082.	1901.	2067.	2067.
THOUS CU M		1334.	2344.	2550.	2550.

	25.	92.	145.	252.	407.	524.	636.	659.	743.	756.
	727.	662.	585.	525.	467.	416.	371.	330.	294.	262.
	233.	208.	185.	165.	147.	131.	116.	104.	92.	82.
	73.	65.	58.	52.	46.	41.	36.	32.	29.	26.
	23.	20.	18.	16.	14.	13.	11.	10.	9.	8.
	7.	6.								

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.30	1	0.00	0.	0.00	8.	1.02	14.00	76	0.53	0.48	0.05	1095.
1.01	1.00	2	0.00	0.	0.00	7.	1.02	14.30	77	1.17	1.12	0.05	1422.
1.01	1.30	3	0.00	0.	0.00	7.	1.02	15.00	78	1.17	1.12	0.05	1852.
1.01	2.00	4	0.00	0.	0.00	7.	1.02	15.30	79	1.42	1.37	0.05	2389.
1.01	2.30	5	0.00	0.	0.00	7.	1.02	16.00	80	4.49	4.44	0.05	3106.
1.01	3.00	6	0.00	0.	0.00	6.	1.02	16.30	81	1.09	1.04	0.05	4036.
1.01	3.30	7	0.00	0.	0.00	6.	1.02	17.00	82	1.09	1.04	0.05	5097.
1.01	4.00	8	0.00	0.	0.00	6.	1.02	17.30	83	0.85	0.80	0.05	6203.
1.01	4.30	9	0.00	0.	0.00	6.	1.02	18.00	84	0.85	0.80	0.05	7288.
1.01	5.00	10	0.00	0.	0.00	5.	1.02	18.30	85	0.06	0.01	0.05	8282.
1.01	5.30	11	0.00	0.	0.00	5.	1.02	19.00	86	0.06	0.01	0.05	9081.
1.01	6.00	12	0.00	0.	0.00	5.	1.02	19.30	87	0.06	0.01	0.05	9614.
1.01	6.30	13	0.01	0.	0.01	5.	1.02	20.00	88	0.06	0.01	0.05	9866.
1.01	7.00	14	0.01	0.	0.01	5.	1.02	20.30	89	0.06	0.01	0.05	9831.
1.01	7.30	15	0.01	0.	0.01	4.	1.02	21.00	90	0.06	0.01	0.05	9487.
1.01	8.00	16	0.01	0.	0.01	4.	1.02	21.30	91	0.06	0.01	0.05	8886.
1.01	8.30	17	0.01	0.	0.01	4.	1.02	22.00	92	0.06	0.01	0.05	8170.
1.01	9.00	18	0.01	0.	0.01	4.	1.02	22.30	93	0.06	0.01	0.05	7423.
1.01	9.30	19	0.01	0.	0.01	4.	1.02	23.00	94	0.06	0.01	0.05	6680.
1.01	10.00	20	0.01	0.	0.01	4.	1.02	23.30	95	0.06	0.01	0.05	5976.
1.01	10.30	21	0.01	0.	0.01	3.	1.03	0.	96	0.06	0.01	0.05	5337.
1.01	11.00	22	0.01	0.	0.01	3.	1.03	0.30	97	0.	0.	0.	4769.
1.01	11.30	23	0.01	0.	0.01	3.	1.03	1.00	98	0.	0.	0.	4261.
1.01	12.00	24	0.01	0.	0.01	3.	1.03	1.30	99	0.	0.	0.	3808.
1.01	12.30	25	0.06	0.	0.06	3.	1.03	2.00	100	0.	0.	0.	3403.
1.01	13.00	26	0.06	0.	0.06	3.	1.03	2.30	101	0.	0.	0.	3040.
1.01	13.30	27	0.07	0.	0.07	3.	1.03	3.00	102	0.	0.	0.	2714.
1.01	14.00	28	0.07	0.	0.07	3.	1.03	3.30	103	0.	0.	0.	2423.
1.01	14.30	29	0.09	0.	0.09	2.	1.03	4.00	104	0.	0.	0.	2161.
1.01	15.00	30	0.09	0.	0.09	2.	1.03	4.30	105	0.	0.	0.	1927.
1.01	15.30	31	0.11	0.	0.11	2.	1.03	5.00	106	0.	0.	0.	1717.
1.01	16.00	32	0.34	0.04	0.30	3.	1.03	5.30	107	0.	0.	0.	1529.
1.01	16.30	33	0.08	0.03	0.05	7.	1.03	6.00	108	0.	0.	0.	1362.
1.01	17.00	34	0.08	0.03	0.05	13.	1.03	6.30	109	0.	0.	0.	1212.
1.01	17.30	35	0.06	0.01	0.05	23.	1.03	7.00	110	0.	0.	0.	1080.
1.01	18.00	36	0.06	0.01	0.05	36.	1.03	7.30	111	0.	0.	0.	978.
1.01	18.30	37	0.00	0.	0.00	50.	1.03	8.00	112	0.	0.	0.	939.
1.01	19.00	38	0.00	0.	0.00	65.	1.03	8.30	113	0.	0.	0.	902.
1.01	19.30	39	0.00	0.	0.00	78.	1.03	9.00	114	0.	0.	0.	866.
1.01	20.00	40	0.00	0.	0.00	89.	1.03	9.30	115	0.	0.	0.	832.
1.01	20.30	41	0.00	0.	0.00	96.	1.03	10.00	116	0.	0.	0.	799.
1.01	21.00	42	0.00	0.	0.00	100.	1.03	10.30	117	0.	0.	0.	761.
1.01	21.30	43	0.00	0.	0.00	98.	1.03	11.00	118	0.	0.	0.	737.
1.01	22.00	44	0.00	0.	0.00	93.	1.03	11.30	119	0.	0.	0.	707.
1.01	22.30	45	0.00	0.	0.00	85.	1.03	12.00	120	0.	0.	0.	675.
1.01	23.00	46	0.00	0.	0.00	77.	1.03	12.30	121	0.	0.	0.	652.
1.01	23.30	47	0.00	0.	0.00	69.	1.03	13.00	122	0.	0.	0.	626.
1.02	0.	48	0.00	0.	0.00	62.	1.03	13.30	123	0.	0.	0.	601.
1.02	0.30	49	0.04	0.	0.04	55.	1.03	14.00	124	0.	0.	0.	577.
1.02	1.00	50	0.04	0.	0.04	49.	1.03	14.30	125	0.	0.	0.	555.
1.02	1.30	51	0.04	0.	0.04	44.	[illegible]						

MM	[illegible]	[illegible]	114.77		114.77				
AC-FT	1062.	1901.	2067.		2067.				
THOUS CU M	1339.	2344.	2550.		2550.				

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

2.	2.	2.	2.	2.	2.	2.	2.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	2.	4.	6.	10.	14.	17.	21.	24.
26.	27.	26.	25.	23.	21.	19.	17.	15.	13.
12.	11.	9.	8.	7.	7.	6.	5.	5.	4.
4.	6.	10.	17.	27.	39.	54.	71.	85.	107.
125.	141.	159.	187.	231.	296.	384.	500.	645.	839.
1090.	1376.	1675.	1968.	2236.	2452.	2596.	2664.	2654.	2561.
2399.	2206.	2004.	1804.	1613.	1441.	1288.	1151.	1028.	919.
821.	733.	654.	584.	520.	464.	413.	368.	327.	292.
264.	254.	244.	234.	225.	216.	207.	199.	191.	183.
176.	169.	162.	156.	150.	144.	138.	133.	127.	122.
117.	113.	108.	104.	100.	96.	92.	88.	85.	81.
78.	75.	72.	69.	67.	64.	61.	59.	57.	54.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2664.	2265.	995.	361.	51358.
CMS	75.	64.	28.	10.	1471.
INCHES		2.45	4.30	4.67	4.67
MM		62.10	109.10	118.66	118.66
AC-FT		1133.	1974.	2147.	2147.
THOUS CU M		1396.	2435.	2648.	2648.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

4.	4.	4.	3.	3.	3.	3.	3.	3.	3.
3.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	2.	3.	7.	12.	18.	25.	32.	39.	44.
48.	50.	49.	46.	43.	39.	34.	31.	27.	24.
22.	19.	17.	16.	14.	12.	11.	10.	9.	8.
8.	12.	19.	32.	50.	73.	100.	131.	165.	198.
231.	260.	294.	347.	429.	547.	731.	926.	1155.	1553.
2018.	2549.	3101.	3644.	4141.	4540.	4807.	4933.	4915.	4743.
4443.	4085.	3712.	3340.	2988.	2669.	2384.	2131.	1904.	1701.
1520.	1357.	1213.	1081.	963.	858.	764.	681.	606.	540.
489.	470.	451.	433.	416.	399.	384.	368.	354.	340.
326.	313.	301.	289.	277.	266.	256.	245.	236.	226.
217.	209.	200.	192.	185.	177.	170.	164.	157.	151.
145.	139.	134.	128.	123.	118.	114.	109.	105.	101.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4933.	4156.	1843.	669.	96218.
CMS	140.	118.	52.	19.	2725.
INCHES		4.53	7.95	8.65	8.65
MM		115.01	202.04	219.74	219.73
AC-FT		2081.	3655.	3976.	3976.
THOUS CU M		2566.	4508.	4903.	4904.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

8.	7.	7.	7.	7.	6.	6.	6.	6.	5.
5.	5.	5.	5.	4.	4.	4.	4.	4.	4.

461.	520.	585.	654.	731.	819.	919.	1032.	1159.	1299.	1456.
4036.	5097.	6203.	7388.	8382.	9081.	9614.	9866.	9831.	9487.	9103.
3046.	8170.	7423.	6660.	5976.	5337.	4769.	4261.	3808.	3403.	3040.
978.	2714.	2423.	2161.	1927.	1717.	1529.	1362.	1212.	1080.	978.
652.	939.	902.	866.	832.	799.	767.	737.	707.	679.	652.
435.	626.	601.	577.	555.	532.	511.	491.	472.	453.	435.
	418.	401.	385.	370.	356.	341.	327.	314.	302.	

290. 278. 267. 257. 246. 237. 227. 218. 210. 201.

RATIO 4

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5866.	8391.	3686.	1336.	152436.
CMS	279.	239.	104.	38.	5449.
INCHES		9.06	15.91	17.30	17.31
MM		230.01	404.09	439.49	439.57
AC-FT		4161.	7310.	7950.	7952.
THOUS CU M		5133.	9017.	9807.	9809.

****

HYDROGRAPH ROUTING

ROUTED HYDROGRAPH

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	IAAME	ISTAGE	IAUTO
1	1	0	0	2	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0. 0.		0.	-1462.	-1

STAGE	1462.00	1464.00	1465.00	1466.00	1466.50
FLOW	0.	120.00	328.00	330.00	420.00
SURFACE AREA=	0.	287.	455.		
CAPACITY=	0.	557.	7577.		
ELEVATION=	1452.	1462.	1480.		

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
1462.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COOD	EXPD	DAMWID
1466.9	3.1	1.5	270.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

				OUTFLOW					
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	2.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	4.	4.	4.	5.	6.
7.	8.	9.	10.	12.	14.	17.	20.	25.	30.
38.	48.	60.	74.	90.	108.	132.	167.	201.	234.
262.	288.	311.	331.	348.	362.	374.	384.	392.	359.
405.	409.	412.	415.	416.	417.	417.	416.	415.	414.
412.	410.	408.	406.	403.	401.	398.	356.	393.	351.

388.	385.	382.	379.	376.	373.	370.	367.	364.	361.
358.	355.	352.	349.	345.	342.	339.	336.	333.	325.
326.	323.	319.	316.	313.	310.	306.	303.	300.	297.

STORAGE

957.	957.	957.	957.	957.	957.	957.	957.	957.	957.
957.	957.	957.	958.	958.	958.	958.	958.	958.	958.
958.	958.	956.	958.	958.	958.	958.	958.	958.	958.
958.	958.	958.	958.	958.	959.	959.	960.	960.	961.
962.	963.	964.	965.	966.	967.	968.	968.	969.	965.
969.	970.	970.	970.	971.	971.	971.	971.	971.	971.
971.	971.	971.	972.	973.	974.	975.	979.	981.	984.
989.	994.	995.	1006.	1014.	1024.	1037.	1353.	1075.	1104.
1141.	1188.	1246.	1316.	1356.	1485.	1581.	1679.	1778.	1872.
1961.	2041.	2112.	2175.	2229.	2275.	2314.	2347.	2374.	2396.
2414.	2428.	2435.	2447.	2451.	2454.	2454.	2432.	2449.	2444.
2438.	2431.	2424.	2417.	2410.	2402.	2394.	2385.	2377.	2368.
2359.	2350.	2341.	2331.	2322.	2312.	2303.	2293.	2283.	2273.
2263.	2253.	2242.	2232.	2222.	2211.	2201.	2151.	2180.	2170.
2160.	2149.	2135.	2129.	2118.	2108.	2098.	2088.	2078.	2067.

STAGE

1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.1
1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1
1462.1	1462.1	1462.1	1462.2	1462.2	1462.2	1462.3	1462.3	1462.4	1462.5
1462.6	1462.8	1463.0	1463.2	1463.5	1463.8	1464.1	1464.4	1464.7	1465.1
1465.3	1465.6	1465.8	1466.0	1466.2	1466.3	1466.4	1466.5	1466.6	1466.7
1466.7	1466.8	1466.8	1466.8	1466.9	1466.9	1466.9	1466.9	1466.9	1466.8
1466.8	1466.8	1466.8	1466.8	1466.7	1466.7	1466.7	1466.7	1466.6	1466.6
1466.6	1466.6	1466.5	1466.5	1466.5	1466.4	1466.4	1466.4	1466.3	1466.3
1466.3	1466.2	1466.2	1466.2	1466.2	1466.1	1466.1	1466.1	1466.0	1466.0
1466.0	1465.9	1465.9	1465.9	1465.8	1465.8	1465.8	1465.7	1465.7	1465.7

PEAK OUTFLOW IS 417. AT TIME 53.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	417.	415.	380.	161.	23153.
CMS	12.	12.	11.	5.	[illegible]

•OVN•

STATION 1, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	2.	2.	2.	2.	2.	2.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	3.	4.	4.	5.	5.	6.
7.	8.	9.	11.	12.	14.	17.	21.	26.	32.
40.	50.	62.	77.	93.	112.	140.	176.	212.	245.
275.	301.	325.	345.	363.	377.	390.	400.	409.	416.
423.	437.	451.	461.	467.	468.	466.	462.	455.	446.
438.	429.	422.	419.	417.	414.	412.	409.	407.	404.
401.	398.	395.	392.	389.	386.	383.	380.	377.	374.
370.	367.	364.	361.	357.	354.	351.	347.	344.	341.
338.	334.	331.	327.	324.	321.	317.	314.	311.	307.

STORAGE

957.	957.	957.	957.	957.	957.	957.	957.	957.	957.
957.	957.	958.	958.	958.	958.	958.	958.	958.	958.
958.	958.	958.	958.	958.	958.	958.	958.	958.	959.
958.	958.	958.	958.	958.	959.	959.	960.	961.	961.
962.	963.	964.	965.	966.	967.	968.	969.	969.	970.
970.	970.	971.	971.	971.	971.	971.	971.	972.	972.
972.	972.	972.	972.	973.	974.	976.	979.	982.	985.
990.	995.	1001.	1008.	1016.	1026.	1040.	1057.	1080.	1109.
1148.	1197.	1257.	1330.	1413.	1506.	1605.	1707.	1809.	1907.
1999.	2082.	2156.	2221.	2277.	2325.	2365.	2397.	2427.	2451.
2469.	2483.	2494.	2500.	2504.	2505.	2504.	2501.	2496.	2490.
2484.	2476.	2465.	2462.	2454.	2446.	2438.	2429.	2420.	2411.
2402.	2393.	2383.	2373.	2364.	2354.	2344.	2334.	2323.	2313.
2303.	2292.	2282.	2271.	2260.	2250.	2239.	2228.	2218.	2207.
2196.	2185.	2175.	2164.	2153.	2143.	2132.	2122.	2111.	2101.

STAGE

1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1
1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1
1462.1	1462.1	1462.2	1462.2	1462.2	1462.2	1462.3	1462.3	1462.4	1462.5
1462.7	1462.8	1463.0	1463.3	1463.6	1463.9	1464.2	1464.5	1464.9	1465.2
1465.5	1465.7	1466.0	1466.2	1466.3	1466.5	1466.6	1466.7	1466.8	1466.9
1466.9	1467.0	1467.0	1467.0	1467.0	1467.0	1467.0	1467.0	1467.0	1467.0
1467.0	1466.9	1466.9	1466.9	1466.9	1466.8	1466.8	1466.8	1466.8	1466.7
1466.7	1466.7	1466.7	1466.6	1466.6	1466.6	1466.5	1466.5	1466.5	1466.4
1466.4	1466.4	1466.3	1466.3	1466.3	1466.2	1466.2	1466.2	1466.1	1466.1
1466.1	1466.0	1466.0	1466.0	1465.9	1465.9	1465.9	1465.8	1465.8	1465.8

PEAK OUTFLOW IS 468. AT TIME 53.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	468.	450.	399.	169.	24274.

•OVN•

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	2.
2.	3.	3.	3.	4.	4.	4.	5.	5.	5.
5.	5.	5.	5.	6.	6.	6.	6.	6.	6.
6.	6.	6.	6.	6.	7.	8.	8.	10.	11.
13.	15.	17.	20.	23.	27.	32.	39.	47.	58.
73.	91.	113.	155.	209.	265.	323.	381.	501.	966.
1455.	1959.	2309.	2538.	2659.	2692.	2659.	2582.	2474.	2348.
2212.	2072.	1933.	1797.	1667.	1544.	1428.	1319.	1219.	1126.
1041.	966.	901.	844.	793.	749.	709.	673.	641.	612.
585.	561.	539.	519.	500.	484.	469.	455.	443.	432.
424.	419.	417.	414.	411.	408.	405.	402.	399.	396.
393.	390.	387.	384.	380.	377.	374.	370.	367.	364.

STORAGE

957.	957.	957.	957.	957.	958.	958.	958.	958.	958.
958.	958.	958.	958.	958.	958.	959.	959.	959.	959.
959.	959.	959.	959.	959.	959.	959.	959.	959.	959.
959.	959.	959.	959.	960.	960.	961.	962.	964.	965.
967.	969.	971.	973.	975.	976.	978.	979.	980.	981.
981.	982.	982.	983.	983.	984.	984.	984.	984.	984.
984.	985.	985.	986.	987.	989.	993.	997.	1003.	1010.
1018.	1028.	1039.	1051.	1066.	1086.	1110.	1143.	1185.	1239.
1310.	1401.	1514.	1648.	1801.	1970.	2151.	2339.	2523.	2693.
2832.	2936.	3009.	3055.	3078.	3085.	3078.	3063.	3042.	3017.
2989.	2960.	2931.	2901.	2872.	2843.	2815.	2788.	2763.	2738.
2714.	2693.	2672.	2655.	2639.	2624.	2610.	2597.	2585.	2574.
2563.	2552.	2542.	2532.	2523.	2514.	2505.	2496.	2488.	2479.
2471.	2462.	2453.	2444.	2435.	2426.	2416.	2406.	2397.	2386.
2376.	2366.	2356.	2345.	2335.	2324.	2313.	2302.	2292.	2281.

STAGE

1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1
1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1
1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.2	1462.2
1462.2	1462.2	1462.3	1462.3	1462.4	1462.4	1462.5	1462.6	1462.8	1463.0
1463.2	1463.5	1463.9	1464.3	1464.8	1465.4	1466.5	1466.5	1467.1	1467.6
1468.0	1468.3	1468.5	1468.7	1468.7	1468.7	1468.7	1468.7	1468.6	1468.5
1468.5	1468.4	1468.3	1468.2	1468.1	1468.0	1468.0	1467.9	1467.8	1467.7
1467.7	1467.6	1467.5	1467.5	1467.4	1467.4	1467.3	1467.3	1467.3	1467.2
1467.2	1467.2	1467.1	1467.1	1467.1	1467.1	1467.0	1467.0	1467.0	1466.9
1466.9	1466.9	1466.9	1466.8	1466.8	1466.8	1466.8	1466.7	1466.7	1466.7
1466.6	1466.6	1466.6	1466.5	1466.5	1466.5	1466.4	1466.4	1466.4	1466.3

PEAK OUTFLOW IS 2692. AT TIME 48.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2692.	2365.	1185.	496.	64200.

•OVN•

STATION 1, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

CUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	3.	4.
4.	5.	6.	7.	8.	8.	9.	9.	10.	10.
10.	11.	11.	11.	11.	11.	11.	11.	11.	12.
12.	12.	12.	12.	13.	14.	15.	17.	19.	22.
26.	30.	34.	39.	45.	53.	63.	76.	93.	115.
161.	224.	291.	380.	766.	1943.	3369.	4766.	5968.	6882.
7469.	7742.	7756.	7574.	7255.	6850.	6401.	5939.	5481.	5040.
4621.	4229.	3865.	3529.	3220.	2936.	2678.	2442.	2227.	2032.
1857.	1704.	1575.	1465.	1369.	1285.	1211.	1145.	1085.	1031.
982.	937.	896.	858.	822.	789.	758.	729.	702.	676.
652.	629.	608.	587.	568.	550.	533.	516.	501.	487.
474.	461.	450.	440.	431.	424.	419.	417.	414.	412.

STORAGE

957.	957.	958.	958.	958.	958.	959.	959.	959.	959.
959.	960.	960.	960.	960.	960.	960.	961.	961.	961.
961.	961.	961.	961.	961.	961.	961.	961.	962.	962.
962.	962.	962.	962.	963.	964.	966.	968.	971.	974.
978.	982.	986.	989.	993.	996.	998.	1001.	1003.	1004.
1006.	1007.	1008.	1009.	1010.	1011.	1011.	1011.	1012.	1012.
1012.	1013.	1013.	1015.	1018.	1022.	1029.	1038.	1049.	1063.
1080.	1099.	1121.	1146.	1176.	1214.	1264.	1329.	1413.	1522.
1664.	1845.	2067.	2332.	2630.	2933.	3209.	3444.	3629.	3762.
3846.	3884.	3886.	3860.	3815.	3758.	3693.	3624.	3555.	3487.
3420.	3357.	3296.	3238.	3183.	3131.	3082.	3036.	2993.	2952.
2914.	2880.	2851.	2824.	2801.	2780.	2761.	2743.	2727.	2712.
2698.	2684.	2672.	2660.	2649.	2638.	2627.	2617.	2608.	2598.
2589.	2580.	2572.	2563.	2555.	2547.	2539.	2531.	2523.	2516.
2508.	2501.	2493.	2486.	2478.	2470.	2462.	2454.	2446.	2438.

STAGE

1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0
1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.0	1462.1
1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.1	1462.2	1462.2	1462.2
1462.2	1462.2	1462.2	1462.2	1462.2	1462.2	1462.2	1462.2	1462.2	1462.2
1462.2	1462.2	1462.2	1462.2	1462.2	1462.2	1462.3	1462.3	1462.3	1462.4
1462.4	1462.5	1462.6	1462.7	1462.8	1462.9	1463.1	1463.3	1463.6	1463.9
1464.4	1465.0	1465.7	1466.5	1467.4	1468.3	1469.1	1469.8	1470.3	1470.7
1470.9	1471.0	1471.0	1470.9	1470.8	1470.6	1470.5	1470.3	1470.1	1469.9
1469.7	1469.5	1469.3	1469.2	1469.0	1468.9	1468.7	1468.6	1468.5	1468.4
1468.2	1468.1	1468.1	1468.0	1467.9	1467.8	1467.8	1467.7	1467.7	1467.6
1467.6	1467.6	1467.5	1467.5	1467.5	1467.4	1467.4	1467.4	1467.3	1467.3
1467.3	1467.3	1467.2	1467.2	1467.2	1467.2	1467.1	1467.1	1467.1	1467.1
1467.0	1467.0	1467.0	1467.0	1466.9	1466.9	1466.9	1466.9	1466.8	1466.8

PEAK OUTFLOW IS 7756. AT TIME 46.50 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7756.	6685.	3043.	1088.	156632.

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.26	RATIO 2 0.27	RATIO 3 0.50	RATIO 4 1.00
HYDROGRAPH AT	1	8.62	1	2565.	2664.	4933.	9866.
		(0.23E 18)		(72.63)(	75.43)(	139.68)(	279.36)(
ROUTED TO	1	8.62	1	417.	468.	2692.	7756.
		(0.23E 18)		(11.80)(	13.26)(	76.22)(	219.63)(

GARNET LAKE DAM
NY-1167

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

GARNET LAKE DAM
NY - 1167

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1462.00	1462.00	1465.50
STORAGE	957.	957.	2464.
OUTFLOW	0.	0.	420.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.26	1466.87	0.	2454.	417.	0.	53.50	0.
0.27	1467.02	0.12	2505.	468.	6.50	53.00	0.
0.50	1469.74	1.84	3085.	2652.	21.50	48.00	0.
1.00	1470.99	4.09	3886.	7756.	31.00	46.50	0.

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

1) U.S. Department of Commerce; Weather Bureau; Hydrometeorological Report No. 33 - Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours, April 1956.

2) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

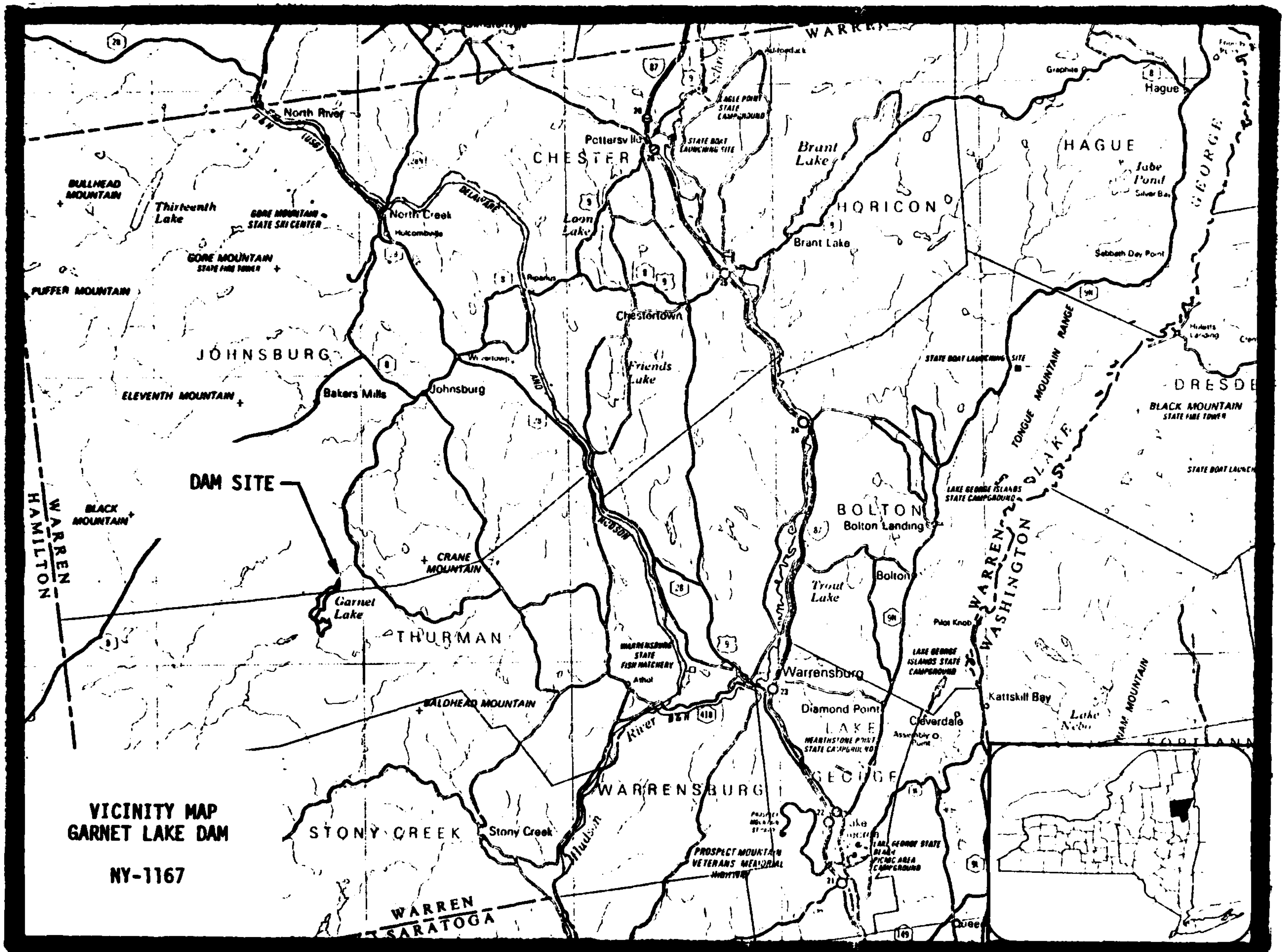
3) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

4) Elwyn E. Seelye, Design, 3rd edition, John Wiley and Sons, Inc., 1960.

5) U.S. Department of the Interior, Bureau of Reclamations; Design of Small Dams, 2nd edition (rev. reprint), 1977.

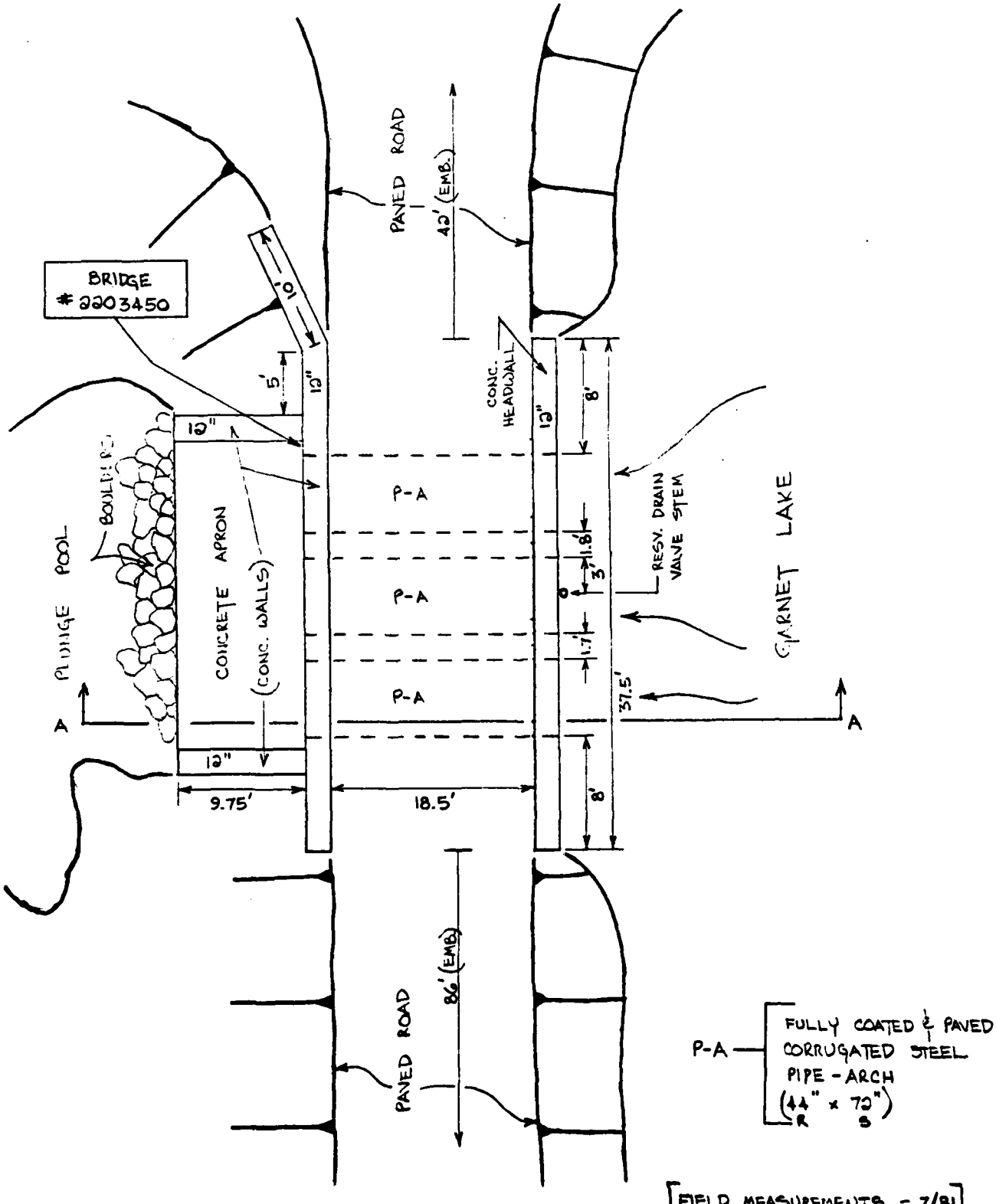
APPENDIX E

DRAWINGS



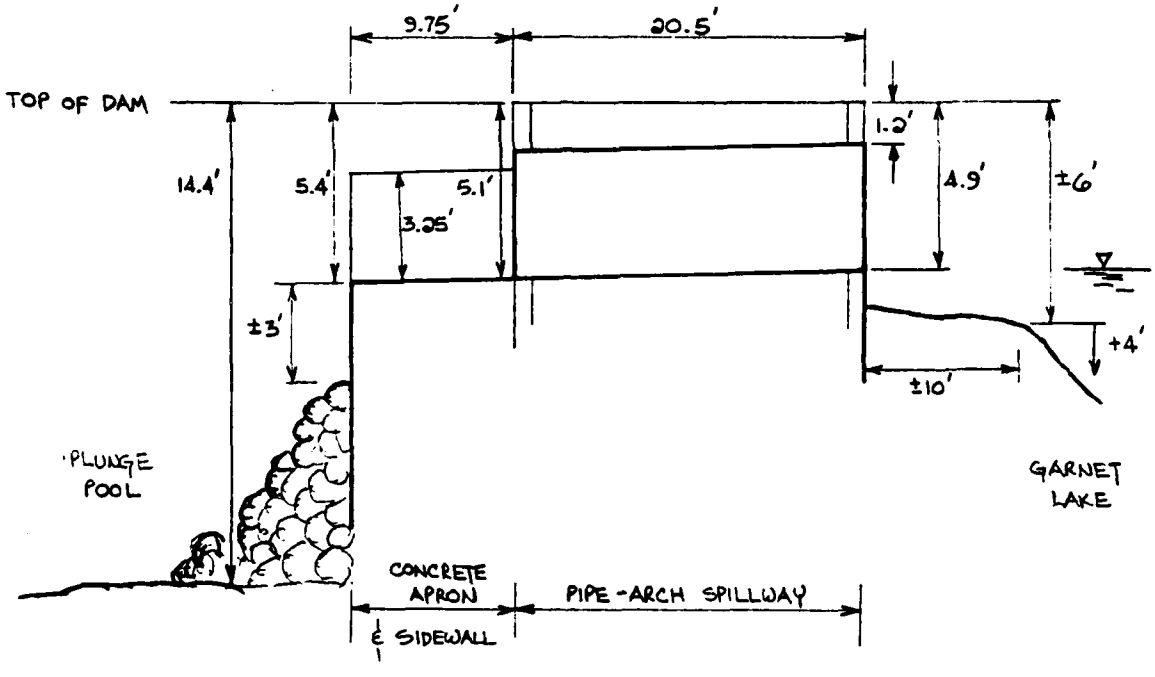
VICINITY MAP
GARNET LAKE DAM
NY-1167

GARNET LAKE DAM
NY - 1167



[FIELD MEASUREMENTS - 7/81]

GARNET LAKE DAM
NY - 1167
[FIELD MEASUREMENTS - 7/81]



SECTION A-A

END

DATE
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3-82

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